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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
STAFIRA, MICHAEL PATRICK	
ART UNIT	**PAPER NUMBER**
2877	

DATE MAILED: 03/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/050,776	HAMAMATSU ET AL.	
	Examiner	Art Unit	
	Michael P. Stafira	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *13-23 and 27* is/are allowed.

6)☒ Claim(s) *1,2,4-12,24-26,28 and 29* is/are rejected.

7)☒ Claim(s) *3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1,2,4-12,24-26,28-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Ishimaru et al. (2001/0030296).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claim 1

Ishimaru et al. (2001/0030296) discloses a stage (Fig. 1, Ref. 10) on which an object (Fig. 1, Ref. 10) to be inspected is mounted; an illumination optical system comprising; an incident illumination system which incident-illuminates illumination light including UV light or DUV light (Page 6, Para 0072) at a point on a surface of the object (Fig. 1, Ref. 10) to be inspected, which is mounted on the stage (Fig. 1, Ref. 10), with desired luminous flux from a normal line direction relative to the surface or from a direction in proximity to the normal line; and a oblique illumination system which oblique-illuminates illumination light including UV light or DUV light at a point on the surface of the object to be inspected with desired luminous flux (See Fig. 1); a detection optical system comprising (See Fig. 10); a high-angle image formation optical system (Fig. 1, Ref. 5) which condenses first high-angle scattered light traveling at a high angle relative to the surface of the object to be inspected, from among first reflection light generated from the point, which has been incident-illuminated by the incident illumination system of the illumination optical system, and second high-angle scattered light traveling at the high angle, from among second reflection light generated from the point, which has been oblique-illuminated by the oblique illumination system of the illumination optical system, in order to perform image formation; and a photoelectric conversion unit which receives the first and the second high-angle scattered light, of which image formation has been performed in the high-angle image formation optical system, to convert the first and the second high-angle scattered light into a first and a second luminance signal (Page 4, Para. 0062); and a comparison and judgment unit (Fig. 1, Ref. 8) which classifies defects on the object to be inspected into concave defects and convex defects on the basis of a correlation between the first luminance signal and

the second luminance signal, which have been converted by the photoelectric conversion unit of the detection optical system (Page 5, Para 0067).

Claim 2

Ishimaru et al. (2001/0030296) further discloses the incident illumination system of the illumination optical system is configured so that stray light is not generated from the high-angle image information optical system (See Fig. 1, Ref. 11).

Claim 4

The reference of Ishimaru et al. (2001/0030296) further discloses that the comparison and judgment unit, the correlation between the first luminance signal and the second luminance signal is used a ratio between the first luminance signal and the second luminance signal (Page 9, Para. 0095).

Claim 5

Ishimaru et al. (2001/0030296) further discloses the comparison and judgment unit is configured to classify concave defects into scratches and thin film-like foreign materials on the basis of data in response to a defect size calculated by the first luminance signal and the second luminance signal (See Fig. 2a).

Claim 6

Ishimaru et al. (2001/0030296) further discloses the comparison and judgment unit is configured to classify foreign materials, which are convex defects, into a small group and a large group on the basis of data in response to a defect size calculated by the first luminance signal and the second luminance signal (See Fig. 2b).

Claim 7

The reference of Ishimaru et al. (2001/0030296) further discloses the comparison and judgment unit is configured to judge that the classified convex defect occurs inside a circuit pattern area (See Fig. 2b).

Claim 8

Ishimaru et al. (2001/0030296) further discloses the comparison and judgment unit has a displaying unit, which displays information of defects, be classified by the comparison and judgment unit (Fig. 1, Ref. 33).

Claim 9

The reference of Ishimaru et al. (2001/0030296) further discloses the comparison and judgment unit has a displaying unit which displays information about a relation of the first luminance signal to be classified the defects (See Fig. 4).

Claim 10

Ishimaru et al. (2001/0030296) further discloses the comparison and judgment unit has a displaying unit for displaying information about a relation of the second luminance signal to discriminate a defect (See Fig. 4).

Claim 11

The reference of Ishimaru et al. (2001/0030296) further discloses the comparison and judgment unit has a displaying unit for plotting a relation between the first luminance signal and the second luminance signal, which have been converted by the photoelectric conversion means of the detection optical system, on a correlation diagram, where a horizontal axis and a vertical axis are expressed by logarithm values, to display the relation (See Fig. 5).

Claim 12

Ishimaru et al. (2001/0030296) discloses in the illumination optical system, a point incident-illuminated by the incident illumination system and a point oblique-illuminated by the oblique illumination system, which are on the surface of the object to be inspected, are configured to be different from each other in a visual field of the detection optical system (See Fig. 1).

Claim 24

Ishimaru et al. (2001/0030296) discloses a incident-illuminating and oblique-illuminating illumination light including UV light or DUV light (Page 6, Para. 0072) on a shallow scratch and a foreign material (Fig. 2a), which are made on a surface of a polished or a ground film, with substantially the same luminous flux; receiving scattered light caused by the shallow scratch and the foreign material by a detector (See Fig. 3a-3b), said scattered light being generated by the incident illumination and the oblique illumination, to convert the scattered light into luminance signals in response to each intensity of the scattered light; and discriminating between the shallow scratch and the particulate foreign material on the basis of a correlation of the converted luminance signals (Page 5-6, Para. 0070-0071).

Claim 25

Ishimaru et al. (2001/0030296) discloses a incident-illuminating and oblique-illuminating illumination light including UV light or DUV light (Page 6, Para. 0072) on a flat thin film-like foreign material and a foreign material, which are made on a surface of a polished, washed, or a sputtered film, with substantially the same luminous flux; receiving scattered light caused by the thin film-like foreign material and the foreign material by a detector (Page 4, Para. 0062), said scattered light being generated by the incident illumination and the oblique illumination, to

convert the scattered light into luminance signals in response to each intensity of the scattered light (Page 4, Para. 0062); and discriminating between the thin film-like foreign material and the particulate foreign material on the basis of a correlation of the converted luminance signals (Page 9, Para. 0095).

Claim 26

Ishimaru et al. (2001/0030296) discloses an illumination step for incident-illuminating illumination light including UV light or DUV light at a point on a surface of an object (Fig. 1, Ref. 10) to be inspected (Page 6, Para. 0072), which is mounted on a stage (Fig. 1, Ref. 15), with desired luminous flux from a normal line direction relative to the surface or from a direction in proximity to the normal line, using an incident-illuminating system; and oblique-illuminating illumination light including UV light or DUV light at a point on the surface of the object to be inspected with desired luminous flux, using a oblique-illuminating system (See Fig. 1); a detection step for condensing first high-angle scattered light traveling at a high angle relative to the surface of the object to be inspected, from among first reflection light generated from the point, which has been incident-illuminated by the illumination step, and second high-angle scattered light traveling at the high angle, from among second reflection light generated from the point, which has been oblique-illuminated by the illumination step, using a high-angle image formation optical system in order to perform image formation; and receiving the first high-angle scattered light and the second high-angle scattered light, for which image formation have been performed (Page 9, Para. 0095), using a photoelectric conversion means to convert the first high-angle scattered light and the second high-angle scattered light into a first and a second luminance signal (Page 9, Para. 0095); and a comparison and judgment (Fig. 1, Ref. 8) step for classifying

defects on the object to be inspected into concave defects and convex defects on the basis of a correlation between the first luminance signal and the second luminance signal, which have been converted by the detection step (Page 10, Para. 0098-0100).

Claim 28

Ishimaru et al. (2001/0030296) discloses a fabrication process for polishing or grinding an object surface of a semiconductor device (See Abstract); a defect inspection process for incident-illuminating and oblique-illuminating illumination light including UV light or DUV light on a shallow scratch and a foreign material (Page 6, Para.0072), which have been made on the object surface polished or ground by the fabrication process, with substantially the same luminous flux; receiving scattered light caused by a shallow scratch and a foreign material by a detector (Page 4, Para. 0062), said scattered light being generated by the incident illumination and the oblique illumination (See Fig. 1), to convert the scattered light into luminance signals in response to each intensity of the scattered light (Page 4, Para. 0062); and discriminating between the shallow scratch and the particulate foreign material on the basis of a correlation of the converted luminance signals (Page, 4, Para. 0062); and a feedback process for supplying the fabrication process with information of the shallow scratch and the particulate foreign material, which have been discriminated in the defect inspection process, as feedback (See Fig. 21).

Claim 29

Ishimaru et al. (2001/0030296) discloses a fabrication process for polishing, washing, or sputtering an object surface of a semiconductor device (See Abstract); a defect inspection process for incident-illuminating and oblique-illuminating illumination light including UV light or DUV light on a flat thin film-like foreign material and a foreign material (Page 6, Para. 0072),

which have been made on the object surface polished, washed, or sputtered by the fabrication process, with substantially the same luminous flux; receiving scattered light caused by the thin film-like foreign material and the foreign material by a detector (Page 4, Para. 0062), said scattered light being generated by the incident illumination and the oblique illumination, to convert the scattered light into luminance signals in response to each intensity of the scattered light (See Fig. 1); and discriminating between the thin film-like foreign material and the particulate foreign material on the basis of a correlation of the converted luminance signals (Page 4, Para. 0062); and a feedback process for supplying the fabrication process with information of the thin film-like foreign material and the particulate foreign material, which have been discriminated in the defect inspection process, as feedback (See Fig. 21).

Allowable Subject Matter

4. Claims 13-23, 27 are allowed over the prior art of record.

5. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 13, 27 the prior art fails to disclose or make obvious an apparatus or method for defect inspecting having an incident illumination system that incident-illuminates illumination light including UV light or DUV light at a point on a surface of the object to be, which is mounted on the, with desired luminous flux from a normal line direction relative to the surface or from a direction in proximity to the normal line; and a oblique illumination system

that oblique-illuminates illumination light including UV light or DUV light, which has a wavelength different from that of said incident-illuminated illumination light, at a point on the surface of the object to be inspected with desired luminous flux, and in combination with the other recited limitations of claims 13, 27. Claims 14-23 are allowed by the virtue of dependency on the allowed claim 13.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Stafira whose telephone number is 571-272-2430. The examiner can normally be reached on 4/10 Schedule Mon.-Thurs..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael P. Stafira
Primary Examiner
Art Unit 2877

February 25, 2004